IN THE ABSTRACT OF THE DISCLOSURE:

Please replace the existing Abstract with the replacement Abstract attached hereto on a separate sheet.

IN THE DRAWINGS:

The attached sheet of drawing includes changes to FIG. 2. This sheet replaces the original sheet of drawing showing FIG. 2. FIG. 2 has been amended to label the boxes identified with reference numerals 11, 13 and 15.

REMARKS

Reconsideration and allowance of the above-identified Application in view of the above amendments and the following remarks are respectfully requested.

By this Amendment, claims 1, 9, 15-17 and 19-23 and the abstract of the disclosure are amended, and claim 26 is cancelled without prejudice or disclaimer. Claims 1, 9 and 15-16 are amended to correct an error. Namely, these claims are amended to positively recite that the processing unit is adapted to calculate a brightness and a color of a plurality of points of the surface from pixels of at least two images of the surface. Support for these amendments may be found, for example, at page 10, lines 21-25 of the detailed description. No new matter has been added. Accordingly, after entry of this Amendment, claims 1-12 and 15-25 will remain pending in the patent application.

It is respectfully submitted that the amendments to the claims do not present new issues that would require further consideration and/or search. Specifically, entry of this Amendment is proper under 37 C.F.R. §1.116 as the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not present any new issues that would require further consideration and/or search as the amendments merely amplify issues discussed throughout the prosecution; (c) do not present any additional claims without canceling a corresponding number of claims; and (d) place the application in better form for appeal, should an appeal be necessary. Entry of this Amendment is thus respectfully requested.

In the Office Action, the drawings were objected to. In connection with the objection, the Office Action indicated that FIG. 2 includes boxes that are not properly labeled. In response, FIG. 2. is amended to label the boxes identified with reference numerals 11, 13 and 15. A replacement sheet including the changes to FIG. 2 is enclosed herewith. Accordingly, reconsideration and withdrawal of the objection to the drawings are respectfully requested.

In the Office Action, the abstract of the disclosure was objected to. In response, a new abstract of the disclosure is attached hereto. It is respectfully submitted that the new abstract fully obviates the objection. Accordingly, reconsideration and withdrawal of the objection to the abstract are respectfully requested.

Claims 1-12 and 15-26 were objected to. This objection is respectfully traversed.

Claim 26 is cancelled without prejudice or disclaimer, thus rendering moot the objection to this claim.

As a preliminary matter, Applicants respectfully note that the Office Action has failed to provide a basis in either 35 U.S.C. or 37 C.F.R. for this objection. The Examiner is respectfully requested to provide such a basis or withdraw the objection to the claims.

In connection with the objection, the Office Action indicated that "in claims 1, 15, 26, recitation of 'wherein the apparatus does not contact the surface' appears to be directed to while the apparatus is being used." In response, claims 1 and 15-16 are amended to positively recite that the apparatus is constructed and arranged to examine the surface without contacting the surface. As such, the amendments to claims 1 and 15-16 make clear that there is no contact between the apparatus and the surface during examination of the surface by the apparatus.

The Office Action also indicated "it is unclear as to what structure would prevent the apparatus from at any point in time contacting the surface." Applicants respectfully disagree with this determination. As clearly explained in the present application, the apparatus includes an analyser and a digital image acquisition device that are placed in the path of the beam reflected by the surface. The analyser and the digital image acquisition device receive the reflected radiation and the digital image acquisition device transmits the detected signal to the processing unit. In other words, the apparatus makes use of an optical detection to examine the desired surface. As such, it is precisely the optical detection of the reflected light, via the use of the analyser and the digital image acquisition device, that enables one to examine the surface without placing the apparatus in contact with the surface. The claims are amended to positively recite that the apparatus is constructed and arranged to examine the surface without contacting the surface. It is respectfully submitted that these amendments obviate the objection to claims 1, 15-16 and 26.

The Office Action also indicated that "the preamble of claim 9 sets forth a non-contact examination, however, the body of the claim fails to provide for such a limitation." As previously explained, it is precisely the use of an optical detection as recited in steps (i), (ii) and (iii) of claim 9 that enables a non-contact examination. As such, Applicants respectfully submit that the language of claim 9 is clear and definite.

The Office Action further indicated that "any claim that sets forth a polarizer splitter cube should further set forth two cameras." In response, claim 16 is amended to positively recite that the apparatus includes "at least one camera." This amendment fully obviates the objection.

Claim 17 is amended to remove its dependency from claim 15. Claims 19 and 20 are amended to depend from claim 17. Claims 21-23 are amended to refer to the polarization analyser recited in claims 15 and 16. These amendments fully obviate the objection.

Accordingly, reconsideration and withdrawal of the objection to claims 1-12 and 15-26 are respectfully requested.

Claims 1-12 and 15-26 were rejected under 35 U.S.C. §103(a) based on Jacques (U.S. Pat. No. 6,177,984) in view of Wang *et al.* (U.S. Pat. No. 6,804,003) (hereinafter "Wang") and Shiratori *et al.* (U.S. Pat. No. 5,974,160) (hereinafter "Shiratori"). The rejection is respectfully traversed.

Claim 26 is cancelled without prejudice or disclaimer, thus rendering moot the rejection of this claim.

Claim 1 recites an apparatus for examining a surface, comprising a polarization analyser element placed in a path of a light beam reflected by the surface, the polarization analyser element constructed and arranged to alternately transmit a crossed polarization state and a parallel polarization state; a digital image acquisition device disposed in the path of the beam reflected by the surface downstream of the polarization analyser element; and a processing unit configured to calculate a brightness and a color of a plurality of points of the surface from pixels of at least two images of the surface; wherein the apparatus is constructed and arranged to examine the surface without contacting the surface.

The Office Action conceded that Jacques fails to disclose, teach or suggest a non-contact measurement. However, Applicants respectfully submit that there are additional features that are absent in Jacques.

For example, Jacques fails to disclose, teach or suggest a polarization analyser element placed in a path of a light beam reflected by the surface. Jacques merely discloses placing the optical element 38 of Jacques in a path of a light beam scattered by the tissue.

Specifically, Jacques discloses an apparatus including a light source 2 that outputs a beam of light 8. (*See* FIG. 1 of Jacques). In Jacques, a portion of the beam of light 8 is reflected by the surface of the superficial tissue layer 26 to create a specularly reflected light 22. (*See* col. 5, lines 2-10 of Jacques). The light that is not specularly reflected enters the tissue and is denoted as 24. (*See* col. 5, lines 1-10 of Jacques). Jacques further discloses that one portion 28 of the light 24, which enters the tissue, is scattered by the superficial tissue layer 26. (*See* col. 5, lines 10-13 of Jacques). However, Jacques clearly teaches that the superficial scattered light 28 is used for imaging because its interaction with the superficial tissue layer 26 provides optical image contrast optimally localized in layer 26 which is the

site where tissue pathology often arises. (*See* col. 5, lines 20-23 of Jacques). The light 28 scattered from layer 26 escapes the tissue and propagates towards the detection camera system 36. (*See* col. 5, lines 23-26 of Jacques). As such, unlike claim 1, the optical element 38 (identified as the "polarization analyser 14" of claim 1) of Jacques must be placed in a path of a light beam that is scattered by the tissue on camera system 36.

In addition, Applicants respectfully submit that Jacques teaches away from placing the optical element 38 in the path of the specularly reflected light 22 since Jacques clearly teaches that light 22 is not used for imaging. (*See* col. 5, lines 8-10 of Jacques).

Furthermore, Jacques fails to disclose, teach or suggest a polarization analyser element constructed and arranged to alternately transmit a crossed polarization state and a parallel polarization state. In Jacques, the optical element 38 is clearly not constructed and arranged to alternately transmit a cross-polarization state and a parallel polarization state. Rather, the optical element 38 is merely a "tunable liquid-crystal filter which can be electronically switched to pass different narrow bandwidths of light selected from the ultraviolet-visible-near infrared spectral range." (*See* col. 5, lines 36-39 of Jacques). Such a tunable liquid-crystal filter is completely different from a polarization analyser element adapted to alternately transmit a cross-polarization state and a parallel polarization state. As such, Jacques cannot disclose, teach or suggest the polarization analyser of claim 1.

Moreover, Jacques fails to disclose, teach or suggest a digital image acquisition device disposed in the path of the beam reflected by the surface downstream of the polarization analyser element, as mandated by claim 1. As mentioned previously, Jacques does not use the specular reflected light 22 for imaging. Instead, Jacques teaches placing the camera system 36 on the path of light scattered by the tissue 26.

In addition, Jacques fails to disclose, teach or suggest a processing unit configured to calculate brightness and an intensity of a plurality of points of the surface from pixels from at least two images of the surface. As clearly explained in the present application, brightness and intensity are components of the reflected light. Brightness and intensity are not components of the scattered light. Jacques is clearly not concerned with calculating the brightness of the light. Jacques states, for example, that the "detector [is] positioned with respect to said light source such that light emitted by said light source and reflected by said surface is not detected by the detector and, said detector [conducts] arithmetic manipulation of said first light detection and said second light detection scattered by said superficial tissue layer and said deep tissue layer for producing an image comprised exclusively of light scattered by said superficial tissue layer." (*See* col. 8, lines 10-17 of Jacques, emphasis

added). Similar statements may be found in independent claims 23 and 24 of Jacques. As such, by virtue of disclosing that the scattered light is detected by the camera and that the specularly reflected light is not used for imaging, the camera system 36 of Jacques is clearly unable to calculate a brightness and an intensity of a plurality of points of the surface from pixels from at least two images of the surface, as required by claim 1.

Furthermore, and as conceded by the Office Action, Jacques does not disclose, teach or suggest a non-contact apparatus. All of the embodiments disclosed by Jacques clearly show an apparatus in contact with the surface. Jacques teaches that "the glass flat provides a tissue/glass interface that is well coupled and smooth such that oblique incidence of illumination light will cause surface reflectance to reflect at an oblique angle opposite the incident angle of illumination." (*See* col. 2, lines 52-56 of Jacques).

Specifically, the optical element 18 of Jacques is in contact with the tissue in order to provide good optical coupling to the tissue and a smooth element/tissue interface 20 which directs specularly reflected light 22 from the element/tissue interface away from the tissue at a new oblique angle 23. (*See*, e.g., col. 5, lines 3-5 and col. 6, line 23 of Jacques).

Thus, it is precisely because the optical element is in contact with the surface of the tissue that it is possible to direct the reflected light away from the video camera. Applicants respectfully submit that the excerpt in Jacques referred to by the Examiner is more a formal clause than a true technical statement. In particular, Jacques teaches no means or devices, other than the optical element 18 in contact with tissue, that could be used to prevent the reflected light from being detected.

From Jacques' teachings, one of ordinary skill in the art would readily understand that having an optical element in contact with the tissue is essential. As a matter of fact, the examiner's proposed modification of Jacques (i.e., placing the optical element 18 out of contact with the surface of the issue) would clearly defeat the intended purpose of Jacques, and is, therefore, improper per MPEP 2145. Thus, Jacques clearly states that "still another object of the present invention is to provide a video imaging surface capable of using oblique illumination through an optical element in contact with the tissue surface and light collection at an angle that avoids surface reflectance at the air/element interface in order to achieve the rejection of surface glare." (*See* col. 3, lines 51-56 of Jacques, emphasis added).

Applicants respectfully submit that Jacques is merely concerned with the generation of images from the first several hundred micrometers of superficial tissue layers below a tissue surface. (*See* col. 1, lines 7-9 of Jacques). On the contrary, embodiments of the invention are directed to an apparatus and methods for examining a surface.

Wang and Shiratori fail to remedy the deficiencies of Jacques. Wang merely discloses a system for analysing surface characteristics of semi-conductors but fails to disclose, teach or suggest an apparatus as recited in claim 1. Shiratori merely relates to a method and apparatus for measuring gloss irregularity and printing unevenness by acquiring an image of an inspection object with an image pickup device (a TV camera) and detecting in the acquired image bright or dark regions forming closed regions as portions representative of the gloss irregularity and printing unevenness of the inspection object. (*See* col. 2, lines 40-55 of Shiratori). However, Shiratori fails to disclose, teach or suggest an apparatus as recited in claim 1. As such, any reasonable combination of Jacques, Wang and Shiratori cannot result, in any way, in the invention of claim 1.

Claims 2-8 are patentable over Jacques, Wang, Shiratori and a combination thereof at least by virtue of their dependencies from claim 1 and for the additional features recited therein.

Claim 9 is patentable over Jacques, Wang, Shiratori and a combination thereof for at least similar reasons as provided above in connection with claim 1. Namely, Jacques, Wang, Shiratori and a combination thereof do not disclose, teach or suggest a process for a non-contact examination of a keratinous surface, comprising (i) analysing crossed and parallel polarizations of a light beam reflected by the surface; (ii) taking digital images of the crossed and parallel polarizations of the reflected beam; and (iii) calculating a brightness and a color of a plurality of points of the surface from pixels of at least two images of the surface.

Claims 10-12 and 24-25 are patentable over Jacques, Wang, Shiratori and a combination thereof at least by virtue of their dependencies from claim 9 and for the additional features recited therein.

Claims 15 and 16 are patentable over Jacques, Wang, Shiratori and a combination thereof for at least similar reasons as provided above in connection with claim 1.

Namely, Jacques, Wang, Shiratori and a combination thereof do not disclose, teach or suggest an apparatus for examining a surface comprising a source of polarized light constructed and arranged to emit a beam incident on the surface to be examined, a spectrum of the light being substantially the same as a solar spectrum; a polarization analyser element placed in a path of a light beam reflected by the surface; a digital image acquisition device disposed in the path of the beam reflected by the surface downstream of the polarization analyser element; and a processing unit configured to calculate a brightness and a color of a plurality of points of the surface from pixels of at least two images of the surface; wherein the

apparatus is constructed and arranged to examine the surface without contacting the surface, as recited in claim 15.

In addition, Jacques, Wang, Shiratori and a combination thereof do not disclose, teach or suggest an apparatus for examining a surface comprising an optical element selected from the group consisting of an orientable polarization analyser element and a polarizing splitter cube placed in a path of a light beam reflected by the surface; at least one camera configured to take digital images, the camera being placed in the path of the beam reflected by the surface downstream of the polarization analyser element; and a processing unit configured to calculate a brightness and a color of a plurality of points of the surface from pixels of at least two images of the surface; wherein the apparatus is constructed and arranged to examine the surface without contacting the surface.

Claims 17-23 are patentable over Jacques, Wang, Shiratori and a combination thereof at least by virtue of their dependencies from claim 15 and 16 and for the additional features recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 1-12 and 15-26 under 35 U.S.C. §103(a) based on Jacques in view of Wang and Shiratori are respectfully requested.

In view of the foregoing, the claims are now in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to contact the undersigned at the telephone number listed below.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,
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Encl: Replacement Sheet – FIG. 2
Abstract